Response to Unexpected Tank Temperature or Flammable Gas Increase or Level Change

Changes “Other Than Inconsequential” Require These Additional Reviews:

Radiological Controls:
Central Radcon Organization

Safety Basis Compliance Officer

USQ # TF-18-1539-S, Rev. 0

<table>
<thead>
<tr>
<th>Rev-Mod</th>
<th>Release Date</th>
<th>Justification</th>
<th>Summary of Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-7</td>
<td>10/09/2018</td>
<td>TF Automation/DSA Changes</td>
<td>Deleted Step 3.3.5. Modified work step 3.3.8.</td>
</tr>
<tr>
<td>F-6</td>
<td>05/31/2018</td>
<td>WRPS-PER-2018-0215.2</td>
<td>Inconsequential change to update reference title.</td>
</tr>
<tr>
<td>F-5</td>
<td>08/30/2017</td>
<td>PER 17-1176</td>
<td>Updated annulus leak detector information and added additional information regarding LCO 3.5 into the AOP.</td>
</tr>
<tr>
<td>F-4</td>
<td>06/14/2016</td>
<td>Operations request to address response when head space reaches 75% LFL.</td>
<td>Added New Step 3.4.1 for unexpected flammable gas increase.</td>
</tr>
<tr>
<td>F-3</td>
<td>04/13/2016</td>
<td>Operations request to address changing status of AY-102</td>
<td>Modified Step 3.3.4 to address AY-102 exception.</td>
</tr>
</tbody>
</table>

Table of Contents

1.0 Affected Personnel, Facilities, Equipment, or Areas ........................................................................................................... 2
2.0 Entry Conditions ....................................................................................................................................................................... 2
3.0 Actions ............................................................................................................................................................................................. 3
  3.1 Unexpected Temperature Increase ........................................................................................................................................... 3
  3.2 Unexpected Tank Level Change ............................................................................................................................................... 5
  3.3 Unexpected DST Annulus Level Increase ................................................................................................................................. 7
  3.4 Unexpected Flammable Gas Increase ....................................................................................................................................... 9
  3.5 Follow On Actions ....................................................................................................................................................................... 10
4.0 Exit Criteria .................................................................................................................................................................................... 11
  4.1 Unexpected Temperature Increase ........................................................................................................................................... 11
  4.2 Unexpected Tank Level Change or Annulus Level Increase .................................................................................................. 11
  4.3 Unexpected Flammable Gas Increase ....................................................................................................................................... 11
5.0 Records ........................................................................................................................................................................................ 11
1.0 AFFECTED PERSONNEL, FACILITIES, EQUIPMENT, OR AREAS

This procedure applies to WRPS personnel and subcontractors doing work in 200 East Area, 200 West Area, and 600 Area controlled by WRPS and equipment in these areas. This procedure does not apply to WRPS personnel and subcontractors doing work at the 222-S Laboratory Complex.

2.0 ENTRY CONDITIONS

Notification of an underground waste storage tank unexpected temperature increase; unexpected tank level change; unexpected DST annulus level increase; or unexpected flammable gas increase.
3.0 ACTIONS

NOTE - Entry into this procedure may be based on subjective analysis of data obtained from the field and compared to past readings or trends. The determination that an abnormal condition is present requires a response to meet the subjective analytical results present at that time; therefore steps in Sections 3.1 through 3.5 may be performed in parallel or in any logical order at the discretion of the Shift Manager.

Special Instruction:
ENSURE employees are briefed on potential hazards prior to going to field.

3.1 Unexpected Temperature Increase

3.1.1 IF high temperature indication is reported from one instrument (e.g., thermocouple) and other temperature readings for the affected tank appear normal, PERFORM the following steps as applicable;

3.1.1.1 IF possible, USE alternate system to confirm tank temperature conditions using any or all methods below as applicable:
- Temperature Monitoring and Control System (TMACS)
- Hand-held temperature display systems
- Panel mounted display systems
- TFMCS.

3.1.1.2 IF high temperature indication appears to be due to a single instrument failure, EXIT this AOP AND SUBMIT Problem Evaluation Request (PER) requesting that Engineering evaluate the instrument.

3.1.2 ANNOUNCE entering TF-AOP-005 over Tank Farm radio channel(s) for unexpected temperature increase AND

SEND SOEN message that includes the following:
- Entry into TF-AOP-005
- Event and location
- Required actions for affected personnel/protective actions as applicable
- Access approval and authority as applicable.
3.1 Unexpected Temperature Increase (Cont.)

3.1.3 SECURE potential heat generating activities to applicable tank such as, but not limited to:
- Waste Transfers
- Chemical additions.

3.1.4 EVALUATE the need to enter TFC-OPS-OPER-C-24 for categorizing and/or reporting abnormal event or occurrence.

3.1.5 MAKE notifications per TFC-OPS-OPER-C-57.

3.1.6 CONFIRM active primary and annulus ventilation is operating as applicable and ventilation flow paths, including ventilation inlet stations, are OPEN to affected tank.

3.1.7 ENSURE cover blocks are installed on pits connected to headspace of affected tank.

3.1.8 MONITOR affected tank for over-pressurization indications that may be caused by a steam release event in tank, or a tank bump.

3.1.8.1 IF tank bump or over-pressurization occurs, CONTACT Safety and Health to determine respiratory protection requirements.

3.1.9 EVALUATE increasing frequency of temperature monitoring to ensure changes in tank conditions are quickly recognized.

3.1.10 EVALUATE corrective actions that will restore temperature to within expected ranges as safely and soon as practical, with assistance from other organizations as required. Steps to consider may include:
- Installing portable active ventilation on tanks with only passive ventilation capability
- Increasing ventilation flow rate (primary and/or annulus) within established limits per applicable procedures for tanks with installed active ventilation.
3.2 Unexpected Tank Level Change

3.2.1 If a transfer, water flush, water addition, or chemical addition operation is occurring to physically connected tanks or transfer lines, Secure the operation.

3.2.2 Announce entering TF-AOP-005 over Tank Farm radio channel(s) for unexpected tank level change AND send SOEN message that includes the following:

- Entry into TF-AOP-005
- Event and location
- Required actions for affected personnel/protective actions as applicable
- Access approval and authority as applicable.

3.2.3 If available, check raw water supply flow meter to affected Tank Farm for indication of a Raw Water leak.

3.2.3.1 If raw water is leaking, or is suspected of leaking into the affected tank, go to TF-AOP-010, Response to Flooding Conditions and perform applicable actions to isolate the Raw Water.

3.2.4 If level increases can be attributed to snow melt or heavy rainfall consider actions in TF-AOP-010.

3.2.5 If unexpected level increases occur in 241-AN-101, 241-AW-102, or 241-AP-103, evaluate possible sources:

- 241-AN-101 - Possible sources: water intrusion into 241-AN valve pits or AN-101 central pump pit
- 241-AW-102 - Possible sources: Leak in 242-A Evaporator, 272-AW Decon Shower, AW Water Service Building, or water intrusion into 241-AW valve pits or AW-102 central pump pit
- 241-AP-103 - Possible sources: Leak in AP Water Service Building, or water intrusion into 241-AP valve pit or AP-103 central pump pit.
3.2 Unexpected Tank Level Change (Cont.)

NOTE - An increasing waste level coupled with increasing waste temperature and/or loss of ventilation may indicate a pending tank bump is developing.

3.2.6 IF a tank level increase and/or increasing waste temperatures are observed, REQUEST assistance from Engineering to analyze if a Tank Bump may be developing.

3.2.6.1 Process Engineering CONTACT the CSM if a Tank Bump is suspected AND ENSURE all appropriate flammable gas controls are in place prior to conducting work.

3.2.7 REVIEW TF-REC-001, Attachment 6 for additional actions.

3.2.8 EVALUATE the need to enter TFC-OPS-OPER-C-24 for categorizing and/or reporting abnormal event or occurrence.

3.2.9 MAKE notifications per TFC-OPS-OPER-C-57.

3.2.10 NOTIFY On-Call Environmental Representative of unexpected tank level increase.
3.3 Unexpected DST Annulus Level Increase

Limit  LCO 3.5 Annulus Flammable Gas Control

Immediate Actions:

3.3.1 ANNOUNCE entering TF-AOP-005 over Tank Farms radio channel(s) for unexpected annulus level increase AND

SEND SOEN message that includes the following:
- Entry into TF-AOP-005
- Event and location
- Required actions for affected personnel/protective actions as applicable
- Access approval and authority as applicable.

3.3.2 IF annulus level is > 15 inches, ENTER LCO 3.5 AND

INITIATE flammable gas monitoring of the annulus at a frequency that will ensure changes in tank conditions are quickly recognized.

3.3.3 IF TMACS Tank Annulus Leak Detected Alarm is received, VERIFY
Immediate Actions for alarm received per ARP-T-041-00003.

3.3.4 PREPARE temporary round sheets for associated annulus liquid levels and primary level (with the exception of AY-102).
3.3 Unexpected DST Annulus Level Increase (Cont.)

3.3.5 NOTIFY On-Call Environmental Representative of unexpected annulus level increase.

3.3.6 MAKE notifications per TFC-OPS-OPER-C-57.

3.3.7 EVALUATE the need to enter TFC-OPS-OPER-C-24 for categorizing and/or reporting abnormal event or occurrence.

3.3.8 IF a primary leak is confirmed, PERFORM the following.

3.3.8.1 SECURE annulus exhauster.

3.3.8.2 CONVENE a response team with Management, Engineering, Operations, and Facilities representatives to begin execution of emergency pumping activities and to identify any interim surveillances or actions not already identified.

3.3.9 NOTIFY Procedures Group to issue appropriate Emergency Pumping Procedure, TO-001-2XX for verification and validation.
3.4 Unexpected Flammable Gas Increase

Immediate Actions Flammable Gas Increase

**Limit** LCO 3.1 DST Primary Tank Ventilation Systems

**Limit** LCO 3.2 SST Steady-State Flammable Gas Control

**Limit** LCO 3.4 DST Induced Gas Release Event Flammable Gas Control

**Limit** LCO 3.6 DCRT Steady-State Flammable Gas Control

**Limit** LCO 3.7 DST Flammable Gas Monitoring Control

3.4.1 **IF** head space gases increase beyond 75% of the Lower Flammability Limit with failure of tank ventilation, **REVIEW** Emergency Action Level criterion (DOE-0223, RLEP 1.0 Appendix 1-2.A and RLEP 1.0 Appendix 1-2.M).

3.4.2 **IF** flammable gas levels have risen unexpectedly, **CONSIDER** restricting entrance to the affected area.

3.4.3 **IF** flammable gas levels exceed 25% of the Lower Flammability Limit (LFL), **PERFORM** actions of the applicable LCO.

3.4.4 **IF** flammable gas levels exceed 5% and are less than or equal to 25% of the LFL for Double Shell Tanks (DSTs), **CONFIRM** the ventilation is operating as applicable and ventilation flow paths, including ventilation inlet stations, are OPEN to affected tank.

3.4.4.1 **PERFORM** additional flammable gas monitoring on affected Tank(s) to verify abnormal flammable gas levels and to determine if unexpected increase in flammable gas levels extends into connected vapor spaces. (TF-OPS-IHT-001, IHT Flammable Gas Surveillance on Double Shell Tanks)

3.4.5 **IF** flammable gas levels exceed 15% and are less than or equal to 25% of the LFL for Single Shell Tanks (SSTs) and Double Container Receiver Tanks (DCRTs), **CONFIRM** the ventilation is operating as applicable and ventilation flow paths, including ventilation inlet stations, are OPEN to affected tank.

3.4.5.1 **PERFORM** additional flammable gas monitoring on affected Tank(s) to verify abnormal flammable gas levels and to determine if unexpected increase in flammable gas levels extends into connected vapor spaces. (TF-OPS-IHT-002, Perform IHT Flammable Gas Surveillance on Single Shell Tanks and DCRTs)
3.4 Unexpected Flammable Gas Increase (Cont.)

3.4.6 **ANNOUNCE** entering into TF-AOP-005 over Tank Farm radio channel(s) for unexpected flammable gas increase **AND**

SEND SOEN message that includes the following:
- Entry into TF-AOP-005
- Event and location
- Required actions for affected personnel/protective actions as applicable
- Access approval and authority as applicable.

3.4.7 **IF** flammable gas readings are quickly approaching maximum limit of 25% of Lower Flammability Limit (LFL) prepare for entrance into the applicable LCO:

3.4.7.1 **STOP** all global waste disturbing and tank intrusive activities and operations, and remove workers from vicinity of flammable gas hazard until cause can be determined and situation corrected.

3.4.7.2 **REQUEST** Engineering to identify installed equipment that may be potential ignition sources and determine if they meet Ignition Source Control Set #1 or #2. (TFC-ENG-FACSUP-P-17, Flammable Gas Activities Ignition Control)

3.4.7.3 **DE-ENERGIZE** equipment as necessary to minimize ignition sources.

3.4.8 **EVALUATE** the need to enter TFC-OPS-OPER-C-24 for categorizing and/or reporting abnormal event or occurrence.

3.4.9 **MAKE** notifications per TFC-OPS-OPER-C-57.

3.5 Follow On Actions

**NOTE** - Actual steps taken for restoration are dependent on specific situation and facility configuration at the time of event. The following steps are general guidance and may be performed concurrently or in any order at discretion of the Shift Manager to fit situation.

3.5.1 **RESTORE** normal ventilation and ventilation flow rates, as applicable.

3.5.2 **SECURE** increased monitoring that may have been initiated due to unexpected condition.
4.0 EXIT CRITERIA

4.1 Unexpected Temperature Increase

4.1.1 High temperature indication was determined to be caused by failed instrumentation and steps have been initiated to correct condition,

OR

Actions taken have corrected temperatures, reducing them to within expected or normal readings or unexpected increase has stabilized within an acceptable range.

4.1.2 ANNOUNCE exiting TF-AOP-005 over Tank Farm radio channel(s) AND SEND SOEN message for exiting TF-AOP-005.

4.2 Unexpected Tank Level Change or Annulus Level Increase

4.2.1 Cause of tank level change has been corrected and/or level has stabilized at acceptable level,

OR

Recovery plan has been developed to address tank level change,

OR

Follow on actions are covered in TF-REC-001.

4.2.2 ANNOUNCE exiting TF-AOP-005 over Tank Farm radio channel(s) AND SEND SOEN message for exiting TF-AOP-005.

4.3 Unexpected Flammable Gas Increase

4.3.1 Cause of unexpected flammable gas increase has been corrected and levels have stabilized below 5% LFL or returned to normal ranges.

4.3.2 ANNOUNCE exiting TF-AOP-005 over Tank Farm radio channel(s) AND SEND SOEN message for exiting TF-AOP-005.

5.0 RECORDS

No records are generated during the performance of this procedure.